WHAT IS CLAIMED IS:

1. A cryosurgery apparatus comprising a sheath forming a first hollow and having a distal portion, said distal portion being sufficiently sharp so as to penetrate into a body, said first hollow being designed and constructed for containing a plurality of cryoprobes each of said cryoprobes being operable to be deployed through openings in said sheath into tissues surrounding said sheath, and at least some of said cryoprobes being operable to cryoablate tissues external to said sheath when so deployed.

2. The apparatus of claim 1, wherein said sheath comprises thermal insulation designed and constructed so as to hinder the passage of heat between said hollow and tissues of the body, when said sheath is positioned within the body.

3. The cryosurgery apparatus of claim 1, wherein said hollow is partitioned into a plurality of longitudinal compartments, each of said plurality of longitudinal compartments is designed and constructed for containing at least one of said plurality of cryoprobes.

4. The cryosurgery apparatus of claim 1, further comprising a cooling device designed and constructed to cool said hollow.

5. The cryosurgery apparatus of claim 1 further comprising a heating device designed and constructed to heat said hollow.

6. The cryosurgery apparatus of claim 4, further comprising a heating device designed and constructed to heat said hollow.

7. The cryosurgery apparatus of claim 6, wherein said cooling device and said heating device are a combined heating/cooling device.

8. The cryosurgery apparatus of claim 7, wherein said combined heating/cooling device is a Joule-Thomson heat exchanger.

9. The cryosurgery apparatus of claim 4, wherein said cooling device is a Joule-Thomson heat exchanger.

10. The cryosurgery apparatus of claim 1, further comprising a cooling device for pre-cooling gasses which are passed through at least a portion of said hollow and are subsequently delivered to at least one of said cryoprobes.

11. The cryosurgery apparatus of claim 10, wherein said cooling device is a Joule-Thomson heat exchanger.

12. The cryosurgery apparatus of claim 1, further comprising a heating and cooling device for pre-heating and pre-cooling gasses which are passed through at least a portion of said hollow and are subsequently delivered to at least one of said cryoprobes.

13. The cryosurgery apparatus of claim 12, wherein said heating and cooling device is a Joule-Thomson heat exchanger.

14. The cryosurgery apparatus of claim 1, further comprising a thermal sensor for monitoring a temperature in said hollow.

15. The cryosurgery apparatus of claim 14, wherein said thermal sensor is a thermocouple.

16. The apparatus of claim 1, further comprising said plurality of cryoprobes.

17. The cryosurgery apparatus of claim 16, wherein at least one of said plurality of cryoprobes is coolable.

18. The cryosurgery apparatus of claim 17, wherein said coolable cryoprobe is also heatable.

19. The cryosurgery apparatus of claim 16, wherein at least one of said plurality of cryoprobes comprises a Joule-Thomson heat exchanger having a Joule-Thomson orifice, for changing a temperature of said cryoprobe.

20. The cryosurgery apparatus of claim 16, wherein at least one of said plurality of cryoprobes comprises a distal operating head which includes a thermally conductive outer shell having a closed distal end and a chamber formed within the shell, said operating head being adapted to be inserted into a body and to effect cryoablation thereat.

21. The cryosurgery apparatus of claim 20, wherein said chamber serves as a reservoir for housing a fluid in contact with at least a portion of said outer shell of said distal operating head.

22. The cryosurgery apparatus of claim 16, wherein at least one of said plurality of cryoprobes is designed and constructed coupleable to at least one high-pressure gas source.

23. The apparatus of claim 16, wherein at least one of said plurality of cryoprobes comprises a first Joule-Thomson heat exchanger operable to cool said cryoprobe to cryoablation temperatures.

24. The apparatus of claim 23, further comprising a second Joule-Thomson heat exchanger in said sheath, operable to cool said hollow.

25. The apparatus of claim 23, further comprising a second Joule-Thomson heat exchanger within said sheath and external to said cryoprobes, said second Joule-Thomson heat exchanger being operable to cool a high-pressure gas delivered to said first Joule-Thomson heat exchanger.

26. The apparatus of claim 23, further comprising a first heat exchanging configuration operable to facilitate exchange of heat between high-pressure gas delivered to said first Joule-Thomson heat exchanger, and low-pressure gas depressurized by expansion through a first Joule Thomson orifice in said first Joule-Thomson heat exchanger.

27. The apparatus of claim 26, wherein said first heat-exchanging configuration comprises a porous matrix.

28. The apparatus of claim 27, wherein said porous matrix further comprises a conduit tunneling through at least a portion of said porous matrix.

29. The apparatus of claim 27, wherein said porous matrix comprises a conduit formed as a spiral integrated into said porous matrix.

30. The apparatus of claim 25, further comprising a second heat exchanging configuration operable to facilitate exchange of heat between high-pressure gas delivered to said second Joule-Thomson heat exchanger, and low-pressure gas depressurized by expansion through a second Joule Thomson orifice in said second Joule-Thomson heat exchanger.

31. The apparatus of claim 30, wherein said second heat-exchanging configuration comprises a porous matrix.

32. The apparatus of claim 31, wherein said porous matrix further comprises a conduit tunneling through at least a portion of said porous matrix.

33. The apparatus of claim 31, wherein said porous matrix comprises a conduit formed as a spiral integrated into said porous matrix.

34. The apparatus of claim 1, wherein at least one of said cryoprobes is operable to be controllably connected to a first source of high-pressure gas.

35. The cryosurgery apparatus of claim 34, wherein said first high-pressure gas source is a source of at least one gas selected from a group consisting of high-pressure argon, high-pressure nitrogen, high-pressure air, high-pressure krypton, high-pressure CF4, high-pressure N2O and high-pressure carbon dioxide.

36. The apparatus of claim 34, wherein said first gas source provides a gas that cools when expanding after passage through a Joule-Thomson orifice.

37. The apparatus of claim 34, wherein said sheath is operable to be controllably connected to said first source of high-pressure gas.

38. The apparatus of claim 34, wherein said at least one cryoprobe is further operable to be controllably connected to a second source of high-pressure gas.

39. The cryosurgery apparatus of claim 38, wherein gas provided by said second gas source has an inversion temperature lower than the temperature obtained by liquefaction of gas provided by said first gas source.

40. The cryosurgery apparatus of claim 38, wherein said second high-pressure gas source is a source of high-pressure helium.

41. The cryosurgery apparatus of claim 38, further comprising control elements for regulating a flow of gas from each of said first gas source and said second gas source.

42. The cryosurgery apparatus of claim 38, designed and constructed so as to facilitate exchange of heat between two temperature states of gas from said first high-pressure gas source, gas in a first state being at a first temperature prior to passing through said first Joule-Thomson orifice, and gas in a second state being at a second temperature subsequent to passing through said first Joule-Thomson orifice.

43. The apparatus of claim 38, wherein said sheath is operable to be controllably connected to said first source of high-pressure gas and to said second source of high-pressure gas.

44. The apparatus of claim 34, wherein said at least one cryoprobe comprises a first Joule-Thomson heat exchanger controllably connected to said first gas source, said first Joule-Thomson heat exchanger is operable to cool said cryoprobe to cryoablation temperatures.

45. The apparatus of claim 44, wherein said first Joule-Thomson heat exchanger is controllably connected to said second gas source, and said first Joule-Thomson heat exchanger is operable to heat said cryoprobe.

46. The apparatus of claim 37, wherein said sheath further comprises a second Joule-Thomson heat exchanger external to said plurality of cryoprobes, said second Joule-Thomson heat exchanger is controllably connected to said first source of compressed gas and is operable to cool said hollow.

47. The cryosurgery apparatus of claim 38, further comprising control elements for regulating a flow of gas from each of said first gas source and said second gas source.

48. The cryosurgery apparatus of claim 46, designed and constructed so as to facilitate exchange of heat between two temperature states of gas from said first high-pressure gas source, gas in a first state being at a first temperature prior to passing through said second Joule-Thomson orifice, and gas in a second state being at a second temperature subsequent to passing through said second Joule-Thomson orifice.

49. The apparatus of claim 46, wherein said second Joule-Thomson heat exchanger is controllably connected to a second source of compressed gas, and is operable to heat said hollow.

50. The cryosurgery apparatus of claim 1, further comprising a heating and cooling device for pre-heating and pre-cooling gasses which are passed through at least a portion of said first hollow and are subsequently delivered to at least one of said cryoprobes.

51. The cryosurgery apparatus of claim 50, further comprising a heat-exchanging configuration for exchanging heat between a gas passed to said heating and cooling device.

52. The cryosurgery apparatus of claim 1, wherein at least one of said plurality of cryoprobes comprises a first thermal sensor for monitoring a temperature in said cryoprobe, and wherein said hollow comprises a second thermal sensor for monitoring a temperature in said hollow.

53. The cryosurgery apparatus of claim 52, wherein at least one of said first thermal sensor and said second thermal sensor is a thermocouple.

54. The cryosurgery apparatus of claim 1, wherein said distal end of said sheath is formed with a plurality of openings for deployment therethrough of said plurality of cryoprobes.

55. The apparatus of claim 1, wherein at least one of said plurality of cryoprobes is designed and constructed so as to expand laterally away from said sheath when deployed.

56. The apparatus of claim 55, wherein each of said plurality of cryoprobes deploys from said sheath each according to a predetermined path.

57. The cryosurgery apparatus of claim 1, wherein said plurality of cryoprobes are designed and constructed to be deployed laterally away from the sheath to form a predetermined arrangement of deployed cryoprobes.

58. The cryosurgery apparatus of claim 1, wherein said plurality of cryoprobes are designed and constructed to advance from within said sheath and deploy in a lateral direction away from a periphery of said sheath, thereby defining a three-dimensional cryoablation volume.

59. The cryosurgery apparatus of claim 58, wherein at least some of said plurality of cryoprobes are designed and constructed to advance, during deployment, in a plurality of different directions.

60. The cryosurgery apparatus of claim 58, wherein said three-dimensional cryoablation volume is of a predetermined shape.

61. The cryosurgery apparatus of claim 1, wherein each of said cryoprobes is retractable and advanceable in and out of said sheath.

62. The cryosurgery apparatus of claim 1, further comprising an advancing and retracting member operably coupled to at least one cryoprobe of said plurality of cryoprobes.

63. The cryosurgery apparatus of claim 1, wherein at least one cryoprobe of said plurality of cryoprobes has a sharp distal end.

64. The cryosurgery apparatus of claim 1, wherein at least one cryoprobe of said plurality of cryoprobes has a blunt distal end.

65. The cryosurgery apparatus of claim 34, wherein at least one of said plurality of cryoprobes further comprises a thermal sensor and feedback control system coupled to said first gas source and to said thermal sensor, said feedback system is responsive to a detected characteristic from said thermal sensor and serves for controlling a rate of delivery of gas from said gas source to said cryoprobe.

66. The cryosurgery apparatus of claim 65, wherein said thermal sensor is positioned at the distal end of said cryoprobe.

67. The cryosurgery apparatus of claim 65, wherein said thermal sensor includes a thermocouple.

68. The cryosurgery apparatus of claim 1, wherein at least one of said plurality of cryoprobes comprises a shape memory alloy material.

69. The cryosurgery apparatus of claim 68, wherein said shape memory alloy material displays stress induced martensite behavior at a deployed position.

70. The cryosurgery apparatus of claim 68, wherein said shape memory alloy material is in a non-stress induced martensite state when said cryoprobe is positioned in said sheath prior to deployment of said cryoprobe outside said sheath.

71. The cryosurgery apparatus of claim 68, wherein said shape memory alloy material is an alloy of nickel titanium.

72. The cryosurgery apparatus of claim 1, wherein a cross section of each of said plurality of cryoprobes is between 0.3 mm and 3 mm.